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BULLETIN  
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§ 33. **Fresh-Water Algae. V.**

By FRANCIS WOLLE.

In making a brief record of the results of another summer among those humble, yet often marvellously beautiful microscopic plants—the Fresh-Water Algae, I gratefully refer to the valuable aid furnished by a number of contributors, the names of some of whom occur in the list below. Among others, this year, I am especially indebted to F. H. Hosford, assisted by C. G. Pringle, who proved himself an indefatigable collector. Vermont was never so searched out before. Among the large collections of Capt. J. Donnell Smith in Florida, in 1879, I was delighted to find a number of Desmids which were overlooked on the first examination. It is gratifying to notice a gradually-awakening interest in this study, for a large field yet remains to be explored. Every research brings out some new plant, or throws some new light on the life-history of species already known.

Last year, the literature of this subject received some valuable additions, a passing notice of which will suffice here. N. Wille contributed a review of the *Chlorophyllaceae* of Norway; a paper on the cell-division of *Confervaceae*; and another on a new genus of *Algae*. Paul Petit, of France, published a paper on the trichogyne of *Hildenbrandtia rivularis*, and an illustrated prodromus of the *Spirogyrae* of the environs of Paris. Paul Richter published an able paper on the forms and manner of development of the cells of *Gloeocystis*, but did not exhaust the subject. In a more recent article he questions the possibility of unicellular Phycochromes changing their generic character. This is of special interest as an endorsement of the more advanced views on the subject. Wittrock and Nordstedt, of Sweden, have issued two more fasciculi (the 17th and 18th) of their “*Exsiccatae*,” each containing fifty-five specimens of dried Algae beautifully arranged, one kind on a page, in book form.

The plants in the following list are, with few exceptions, new to the recorded Alga-flora of the United States.

PHYCOCHROMOPHYCEAE.

**SYNECHOCOCCUS**, Naeg.—This genus embraces a number of the many forms which probably belong to an intermediate developing condition in the life of fresh-water algae. I add another species, which may have no more claim as a distinct plant than the others. It is a distinct form, however, and until its relations shall be determined it may be recorded as

**SYNECHOCOCCUS RACEMOSUS**, *n. sp.*—*S. amorpho aeruginoso*; cellulis minutissimis saepius regulariter perpendicularare densis aggregatis, oblongo-cylindricis utroque polo rotundato, diametro (.0008”) duplo, triplo, raro quadruplo longioribus; cytoplasmate homoganeo laete aeruginoso. Hab. Glass sides of aquarium.

The size of the cells, the bright-aeruginous color and particularly the vertical arrangement of the cells, so as to form a dense stratum, separate this species from all other described forms.

PHORMIDIUM, Ktz.—*Ph. membranaceum*, Ktz., and *Ph. interruptum*, Ktz. Two forms collected by F. H. Hosford in Vermont.

MICROCOLEUS, Desmaz.—*M. lacustris*, Rab. Hab. Pond, Atsion, N. J.

LYNGBYA, Ag.—*L. aestuarii*, Jurg. Hab. Ponds of submarine waters, Dennisville, N. J.

RIVULARIA, Ag.—*R. radians*, Thur., var. *minutula*, Kirch. Collected by Dr. Hobbe in a lake in Minnesota, July, 1880. He reports it "very abundant, covering the surface of the lake for a considerable extent. The natives consider it to be grass-seed washed into the lake." The thalli are in size like small poppy-seeds. Cohn describes a similar appearance on a lake in Silesia. He says that the thalli appear in masses resembling the spawn of fishes.

ISACTIS, Thur.—*I. fluviatilis*, Rab. Collected by F. H. Hosford, Vermont, from pebbles and stones on the borders of lakes. Found also in Green Pond, N. J.

SCYTONEMA, Ag.—*Sc. gracile*, Ktz, var. *TOLYPOTRICHOIDES*, n. var., Witt.: *Pseudoramuli plerumque solitarii; heterocystae et basilares et interjectae*. Diam. fil.  $13\mu$ — $21\mu$ . Hab. In Morris Pond, N. J.

Represented in Wittrock and Nordstedt's "Exsiccatae," No. 389.

*Sc. cincinnata*, Thur. This plant has been previously noticed as *Lyngbya cincinnata*, it having appeared to the describer of the species, Kutzing, of Germany, to belong to that genus. Thuret found the same plant in France, but called it a *Scytonema*. Kirchner collected it in Silesia, and finding the generic character of neither *Lyngbya* nor *Scytonema*, made a new genus—*Chrysostigma*—to include this particular plant. Each quotes the plant of the other authors, implying that they did not see correctly. The fact is that all were right, but that each saw the plant in different conditions. I find the plant in a pond near by. Sometimes it may be classed with one, and then again with the other genus. Its usual appearance is that of a *Lyngbya*, but sometimes it assumes the form under which Kirchner saw it, and at other times it is a perfect *Scytonema*, with yellow heterocysts and single and double branches.

CALOTHRIX, Ag.—*C. radiosa*, Ktz., var. *fuscescens*, Ktz. Collected by F. H. Hosford in Vermont. *C. Orsinianum*, Thur. New Jersey and Pennsylvania.

CALOTHRIX HOSFORDII, n. sp.—*C. strato olivaceo, trichomatibus aggregatis, laete aerugineis, subdichotomo-fasciculato-pseudoramosis, flagelliformibus, in basi crassis (.001") in apice hyalinis longe cuspidatis, leniter flexuosis; articulis diametro triplo-quadruplo brevioribus; vaginis crassis, distincte lamellosis; in basi luteis sursum achrois hyalinis; cellulis perdurantibus basalibus singulis subhemisphericis, trichomatibus diametro subaequalibus*. Diam. trich. s. vag. .0004"—.0005"; vag. ad .001"—.0012". Collected by F. H. Hosford in Vermont.

This plant is nearest to *Calothrix* (*Schizosiphon*, Ktz.) *Meneghi-*

*ana*, Ktz., but differs in the size of the filaments, which are usually twice the diameter, and in the articulations, which are one-half the length.

**CALOTHRIX LACUCOLA**, *n. sp.*—*C. natans*, *fuscescens*, *trichomatis pseudoramosissimis*; ramis subpatentibus, non concretis, modice attenuatis, apice obtusis, leniter curvatis, elongatis, laxissime intricatis; internis sordide aerugineis vel fusciscentibus, homogeneis vel indistincte articulatis; articulis diametro aequalibus ad duplo triplo brevioribus; vaginis arctissimis achrois vel luteolis; cellulis perdurantibus globosis, luteis, plerumque singulis, ad pseudoramulorum basim, trichomatibus diametro aequalibus. Diam. max. cum vag., a basis .0006"—.0008" (15 $\mu$ —20 $\mu$ ). Hab. Splitrock Pond, N. J.

This form appears to be very distinct. It bears a resemblance to *Tolypothrix* in the mode of branching, but is unlike the plants of that genus in having the filaments moderately attenuated from the base to the apex.

**HAPALOSIPHON**, Naeg.—*H. Brebissonii*, Ktz., and *H. tenuissimus*, Grun. Hab. Ponds at Dennisville, N. J.

**SIROSIPHON**, Ktz.—*S. coralloides*, Ktz. I once received a very small specimen of this plant from the late C. F. Austin, but now discover the same form in abundance on stones along the shores of Green Pond, N. J. When remoistened, it emits a strong fragrance of orange or jessamine-blossoms—a peculiarity not noticed in any other species of this genus, but not unlike that observed in the *Chroolepus*, found on the Swiss mountains and known as the "veilchenstein."

#### CHLOROPHYLLOPHYCEAE.

**COELASTRUM**, Naeg.—*C. sphaericum*, Naeg., and *C. microporum*, Naeg. Hab. Ponds, New Jersey and Pennsylvania.

**PANDORINA**, Bory.—*P. morum*, Bory.

**PENIUM**, Bréb.—*P. Brebissonii*, Ralfs, and *P. polymorphum*, Perty. Hab. Ponds, New Jersey.

**CLOSTERIUM**, Nitsch.—*C. decorum*, Bréb., and *C. Ralfsii*, Bréb. Hab. Ponds, Atsion, N. J.

**DOCIDIUM**, Bréb.—*D. dilatatum*, Cleve.

**COSMARIUM**, Corda.—*C. venustum*, Bréb.; *C. pusillum*, Bréb.; *C. quadrangulatum*, Hass.; *C. exiguum*, Archer; *C. nasutum*, Nordst.; *C. elegantissimum*, Lund; *C. pseudopyramidatum*, Lund; *C. subspeciosum*, Nordst.; *C. variolatum*, Lund. The last four species were collected by Capt. J. Donnell Smith in Florida. *C. sexangulare*, Lund. New Jersey. *C. trachypleurum*, Lund. Pennsylvania. *C. pycnochondrum*, Nordst., collected by C. G. Pringle, in Vermont.

**CALOCYLINDRUS**, DeB.—*C. curtus*, Bréb.; *C. Cucurbita*, Bréb.; *C. Palangula*, Bréb.; *C. pseudo-connatus*, Nordst. Pennsylvania and New Jersey.

**EUASTRUM**, Ehrb.—*E. intermedium*, Cleve. Dennisville, N. J.

**MICRASTERIAS**, Ag.—*M. Baileyi*, Ralfs, and *M. Torreyi*, Bailey. Splitrock Pond, N. J.

These two forms were recognized by Prof. Bailey thirty years ago, but have probably not been rediscovered since. The latter species is our largest form in this genus. *M. fimbriata*, Ralfs, var. *apiculata*, Meneg, and *M. papillifera*, Bréb. Atsion, N. J.

STAURASTRUM, Meyen.—*St. trifidum*, Nordst.; *St. Brasiliense*, Nordst.; *St. senarium*, Ehrb.; *St. quadrangulare*, Bréb.; *St. aculeatum*, Ehrb.; *St. setigerum*, Cleve.; *St. Manfredii*, Reinsch; *St. rotula*, Nordst.; and *St. Meriani*, Reinsch, var. *minus-pentagonum*. These nine forms were collected by Capt. J. Donnell Smith in Florida. *St. rugulosum*, Bréb. Pennsylvania. *St. Ophiura*, Lund; *St. arcuatum*, Nordst.; *St. Haaboeliense*, Wille; and *St. gemmatum*, Nordst. New Jersey. *St. terebrans*, Nordst. Pennsylvania and New Jersey.

ARTHRODESMUS, Ehrb.—*A. divergens*, Rab., and *A. jubulatus*, A. Br. Collected in Florida by Capt. J. Donnell Smith.

XANTHIDIUM, Ehrb.—*X. asteptum*, Nordst., and *X. antelopaeum*, var. *polymazon*, Nordst, and var. *triquetrum*, Nordst.—the latter finely in fruit. Pennsylvania.

SPIROGYRA, Link.—*S. punctata*, Cleve. Atsion, N. J.

ZYGOGONIUM, Ktz.—*Z. anomalum*, Hass., var. *CRASSUM*, n. var. In measurement near *Z. crassum*, Ktz., but having the sheath of *Z. anomalum*. Diam. .0025"—.0026"; arts. 1-3 diameters.

CONFERVA, Link.—*C. amoena*, Ktz. Mountain streamlet, Pennsylvania. *C. laeve*, Ktz. Madison Lake, Wisconsin. Collected by Rev. H. D. Kitchel.

RHIZOCLONIUM, Ktz.—*R. Julianum*, Ktz. Connecticut and Massachusetts.

OEDOgonium, Link.—*OE. Franklinianum*, Witt. For diagnosis vide No. 309 of Wittrock and Nordstedt's "Exsiccatae." Collected in Franklin Pond, New Jersey. *OE. stagnale*, Ktz. Bound Brook, N. J. *OE. zigzag*, Cleve, and *OE. acrosporum*, DeBy. Pennsylvania.

BULBOCHAETE, Ag.—*B. rectangularis*, Witt. Pennsylvania. *B. nana*, Witt. Pennsylvania and New Jersey. *B. mirabilis*, Witt. New Jersey.

MICROTHAMNION, Naeg.—*M. Kutzianum*, Naeg. Water-troughs, etc. Pennsylvania.

DRAPARNALDIA, Ag.—*D. spinosa*, Ktz. In streamlet, Glen Onoko, Pa.

ENTOCLADIA, Wille.—*E. Wittrockii*, Wille. Parasitic on aquatic plants.

ULOTHRIX, Ktz.—*U. Lenormandi*, Ktz. This is a submarine plant and was collected by C. G. Pringle, at Presque Isle Lower Canada. It is nearly related to *Hormotrichum* (*Ulothrix*) *Youngcanum*, *H. Carmichaelii*, etc. It presents a peculiar character in the longitudinal division of the cells of some of the filaments, which divide and re-divide a number of times. Normally, there should be only one row of cells in each sheath; but specimens are found having from two to ten rows. In such a case the sheath widens at each division. A similar, seemingly abnormal appearance is often observed in a *Ulothrix* (*Hormidium*) found in Sweden. In this case, the division continues indefinitely until the leaf-like form (known as *Prasiola crispa*) is produced. The question is, what is *Ulothrix* under such circumstances? Is it not an undeveloped form of *Prasiola*?

#### RHODOPHYCEAE.

PORPHYRIDIIUM, Naeg.—*P. cruentum*, Ag. Not infrequent on moist earth and on shaded pavements.